



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/925,059

08/08/2001

Evan Y.W. Zhang

ZYB 0001 PA

2617

7590

10/16/2006

Evan Y. W. Zhang
Zybron Inc.
3915 Germany Lane
Beavercreek, OK 45431

EXAMINER

LEE, SHUN K

ART UNIT

PAPER NUMBER

2884

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/925,059

Applicant(s)

ZHANG, EVAN Y.W.

Examiner

Shun Lee

Art Unit

2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2006 and 10 August 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44-48, 50-57 and 59 is/are rejected.
- 7) ☒ Claim(s) 49 and 58 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/8/01, 8/25/05, & 5/22/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings were received on 22 May 2006. These drawings are acceptable.

Claim Objections

2. Claims 47, 52, and 56 are objected to because of the following informalities:
 - (a) in claim 47, "a common beam splitter" on line 2 should probably be --said beam splitter-- (see "a beam splitter" on line 5 in claim 44 and "beam splitter 126" in Fig. 4B);
 - (b) in claim 52, "derived from" on line 10 should probably be --from said first sensor representative of--;
 - (c) in claim 52, "derived from" on line 11 should probably be --from said first sensor representative of--;
 - (d) in claim 52, "derived from" on line 15 should probably be --from said second sensor representative of--;
 - (e) in claim 52, "derived from" on line 16 should probably be --from said second sensor representative of--; and
 - (f) in claim 56, "a common beam splitter" on line 2 should probably be --said beam splitter-- (see "a beam splitter" on line 5 in claim 52 and "beam splitter 126" in Fig. 4B).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 2884

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 59 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

New dependent claim **59** recites the limitation "wherein: said display and said viewer are arranged such that optical fusion via said third optical output and electronic fusion via said third electronic output can be viewed either simultaneously or individually".

The specification (pg. 6, lines 21-23) discloses that "An eyepiece/display allows selective viewing of the first optical/electronic output, the second optical/electronic output, or the fused optical/electronic output". However, there does not appear to be a written description of a display and a viewer arranged such that optical fusion via a third optical output and electronic fusion via a third electronic output can be viewed simultaneously in the specification as filed.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The specification (pg. 1) describes the visible (VIS) band as ~0.4 μm to ~0.76 μm , the near infrared (NIR) band as ~0.76 μm to ~1.1 μm , the short wave infrared (SWIR) band as ~1.1 μm to ~3 μm , the medium wave infrared (MWIR) band as ~3 μm to ~7 μm , and the long wave infrared (LWIR) band as ~7 μm to ~18 μm .

7. Claims 44 and 48 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hansen (US 5,035,472).

In regard to claim **44**, Hansen discloses (Fig. 4) an image fusing system comprising:

(a) a camera having:

(a1) a common aperture (15, 14A) arranged to allow target radiation to enter said camera along a common optical axis (19);

(a2) a beam splitter (16A) arranged to receive said target radiation passed through said common aperture (15, 14A) and to split said target radiation into a first spectral band (e.g., visible and near infrared; column 3, lines 22-39) and a second spectral band (e.g., 8 μm through 14 μm of a far infrared spectrum channel; column 3, lines 18-22) which is different from said first spectral band;

(a3) a first sensor (28) arranged to receive said radiation in said first spectral band and to provide a first optical output representing a first optical image of said radiation filtered into said first spectral band (e.g., 0.5 μm through 1.1 μm of visible and near infrared spectrum channels; column 3, lines 22-39); and
(a4) a second sensor (18, 26) arranged to receive said radiation in said second spectral band and to provide a second optical output representing a second optical image of said radiation filtered into said second spectral band (e.g., 8 μm through 14 μm of a far infrared spectrum channel; column 3, lines 18-22);

(b) a beam combining device (56) arranged to optically fuse said first optical output from said first sensor (28) and said second optical output from said second sensor (18, 26) into a third optical output; and

(c) a viewer (12A) for viewing said third optical output; wherein:

said first sensor (28) and said second sensor (18, 26) share said common aperture (15, 14A) such that parallax between said first (28) and second (18, 26) sensor is inherently substantially eliminated due to said common optical axis (19).

Hansen also appears to disclose (Figs. 2A-2C) that said camera and said viewer (12A) are aligned (see 14 and 12 in Figs. 2A-2C) along said common optical axis (19) such that parallax between said camera and said viewer (12A) is inherently substantially eliminated due to said common optical axis (19). Alternatively, it would be obvious to one of ordinary skill at the time of the invention to provide a common optical axis in the

system of Korniski *et al.*, in order to obtain a mountable sight which is a physical substitute for a standard mountable telescopic sight.

In regard to claim **48** which is dependent on claim 44, Hansen also discloses (Fig. 4) that said first sensor (28) comprises at least one of a charge coupled device or an image intensifier and generates said first optical output; and said second sensor (18, 26) comprises an infrared focal plane ray (18) and a display (26) to convert an electronic output of said FPA to a visible image corresponding to said second optical output.

8. Claims 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen (US 5,035,472) in view of Owen (US 5,497,266).

In regard to claims **45** and **46** which are dependent on claim 44, Hansen also discloses (Fig. 4) said common aperture (15, 14A) comprises a common objective lens (14A) that is transmissive to at least a portion of said first spectral band (e.g., 0.5 μm through 1.1 μm of visible and near infrared spectrum channels; column 3, lines 22-39) and at least a portion of second spectral band (e.g., 8 μm through 14 μm of a far infrared spectrum channel; column 3, lines 18-22). The system of Hansen lacks an explicit description of a first relay lens in a first optical path between said beam splitter and said first sensor to correct aberrations in said first spectral band (column 5, lines 4-14); and a second relay lens in a second optical path between said beam splitter and said second sensor to correct aberrations in said second spectral band. However, optics (such as aberration correcting lens) for night vision technology are well known in the art. For example, Owen teaches (column 6, line 60 to column 7, line 10) aberration

correcting lenses in order to correct for aberrations. Therefore it would be obvious to one of ordinary skill at the time of the invention to provide aberration correcting lenses in the system of Hansen, in order to correct for aberrations.

In regard to claim **47** which is dependent on claim 44, Hansen also discloses (Fig. 4) that said common optical aperture (15, 14A) comprises a common beam splitter (16A) to split said target radiation into a first optical path and a second optical path. The system of Hansen lacks an explicit description of a first objective lens in said first optical path between said beam splitter and said first sensor to filter radiation into said first spectral band; and a second objective lens in said second optical path between said beam splitter and said second sensor to filter radiation into said second spectral band. However, optics (such as aberration correcting lens) for night vision technology are well known in the art. For example, Owen teaches (column 6, line 60 to column 7, line 10) aberration correcting lenses in order to correct for aberrations. Therefore it would be obvious to one of ordinary skill at the time of the invention to provide aberration correcting lenses in the system of Hansen, in order to correct for aberrations.

9. Claims 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen (US 5,035,472) in view of Horn (US 6,335,526).

In regard to claims **50** and **51** which are dependent on claim 44, the system of Hansen lacks a transmitter capable of wirelessly transmitting to a remote receiver a first electronic output produced by an electro-optic camera and representing a first electronic image of said radiation filtered into said first spectral band, a second electronic output produced by said second sensor and representing a second electronic image of said

radiation filtered into said second spectral band, and a third electronic output from a processor electronically fusing or combining said first electronic output and said second electronic output; and a display device arranged to selectively display at least one of said first electronic output, said second electronic output, and said third electronic output. Horn teaches (column 3, line 1 to column 4, line 23) to obtain electronic images and fused images for automated target recognition wherein these electronic images and fused images can also be selectively displayed a display device with other relevant information and to provide a transmitter capable of wirelessly transmitting to a remote receiver electronic output representing the images, in order to communicate images and other relevant information to a command and control center. Therefore it would be obvious to one of ordinary skill at the time of the invention to obtain electronic images and fused images in the system of Hansen for automated target recognition which can be displayed and/or transmitted together with other relevant information to a command and control center.

In regard to claims **52** and **53**, the cited prior art is applied as in claims 50 and 51 above.

10. Claims 54-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen (US 5,035,472) in view of Horn (US 6,335,526) as applied to claim 52 above, and further in view of Owen (US 5,497,266).

In regard to claim **54** which is dependent on claim 52, the cited prior art is applied as in claim 45 above.

In regard to claim **55** which is dependent on claim 52, the cited prior art is applied as in claim 46 above.

In regard to claim **56** which is dependent on claim 52, the cited prior art is applied as in claim 47 above.

In regard to claim **57** which is dependent on claim 52, the cited prior art is applied as in claims 48 and 50 above.

Allowable Subject Matter

11. Claims 49 and 58 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to a nonobvious improvement over the invention patented in US Patent 5,035,472. The improvement comprises in combination with other recited elements, that said beam combining device comprises a narrow band filter to pass substantially all green light from said first sensor at a peak wavelength of near 0.55 micrometers with a bandwidth of near ± 0.01 micrometers, and to reflect substantially all other visible light from said display of said second sensor and to fuse said VIS/NIR and LWIR images as recited in dependent claims 49 and 58.

Response to Amendment

13. The declaration filed on 22 May 2006 under 37 CFR 1.131 is sufficient to overcome the Korniski *et al.* (US 6,646,799) reference.

Response to Arguments

14. Applicant's arguments, see last three paragraphs on pg. 27 of remarks, filed 22 May 2006, with respect to the rejection(s) of claim(s) 44, 45, 47, and 48 under 35 U.S.C. 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hansen (US 5,035,472).

15. Applicant's arguments, see last third paragraph on pg. 29 of remarks, filed 22 May 2006, with respect to the rejection(s) of claim(s) 46 and 49 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hansen (US 5,035,472).

16. Applicant's arguments, see last third paragraph on pg. 30 of remarks, filed 22 May 2006, with respect to the rejection(s) of claim(s) 50 and 51 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hansen (US 5,035,472).

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SL


CONSTANTINE HANNAHER
PRIMARY EXAMINER